



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

October 30, 2006

Carolina Power and Light Company
ATTN: Mr. James Scarola
Vice President
Brunswick Steam Electric Plant
P. O. Box- 10429-
Southport, NC 28461

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT - NRC INTEGRATED INSPECTION
REPORT NOS. 05000325/2006004 AND 05000324/2006004

Dear Mr. Scarola:

On September 30, 2006, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Brunswick Units 1 and 2 facilities. The enclosed integrated inspection report documents the inspection findings, which were discussed on October 12, 2006 with Mr. T. Cleary and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

As an incentive to encourage licensee participation in the International Atomic Energy Agency Operational Safety Review Team (OSART) Missions, the NRC determined that for those NRC baseline inspections that overlap, either in part or fully with an OSART review, a one-time regulatory credit (reduction in baseline inspection program) would be granted. Based on a review of the inspection report from an OSART inspection conducted at Brunswick in May, 2005, the NRC determined that Brunswick qualified for a 25 percent reduction of the inspection effort for two NRC inspection procedures (IPs) documented in the enclosed report. Specifically, credit was given for IP 71111.05Q, Fire Protection, and IP 71111.22, Surveillance Testing. As such, the scope of the inspection of these procedures was reduced by 25 percent.

This report documents two NRC-identified findings of very low safety significance (Green). The findings were determined to involve violations of NRC requirements. However, because of the very low safety significance and because they are entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs), in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you contest this non-cited violation example, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Brunswick Steam Electric Plant.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

\RA

Binoy Desai, Chief (Acting)
Reactor Projects Branch 4
Division of Reactor Projects

Docket Nos.: 50-325, 50-324
License Nos: DPR-71, DPR-62

Enclosure: Inspection Report 05000325, 324/2006004
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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Report to James Scarola from Binoy Desai dated October 30, 2006

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT - NRC INTEGRATED INSPECTION
REPORT NOS. 05000325/2006004 AND 05000324/2006004

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos: 50-325, 50-324

License Nos: DPR-71, DPR-62

Report Nos: 05000325/2006004 and 05000324/2006004

Licensee: Carolina Power and Light (CP&L)

Facility: Brunswick Steam Electric Plant, Units 1 & 2

Location: 8470 River Road SE
Southport, NC 28461

Dates: July 1, 2006 through September 30, 2006

Inspectors: E. DiPaolo, Senior Resident Inspector
J. Austin, Resident Inspector
J. Diaz-Velez, Health Physicist (Section 20S1, 20S3, 2PS1 & 2PS3)
W. Loo, Senior Health Physicist (Section 20S1, 20S3, 2PS1 & 2PS3)
R. Hamilton, Health Physicist (Section 20S1, 20S3, 2PS1 & 2PS3)
L. Miller, Senior Emergency Preparedness Inspector [in-office] (Section 40A2.3)

Approved by: Binoy Desai, Chief (Acting)
Reactor Projects Branch 4
Division of Reactor Projects

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SUMMARY OF FINDINGS

IR 05000325/2006004, 05000324/2006004; 07/01/06 - 09/30/06; Brunswick Steam Electric Plant, Units 1 and 2; Problem Identification and Resolution.

The report covered a 3-month period of inspection by resident inspectors, three health physicists, and a senior emergency preparedness inspector. Two Green non-cited violations (NCVs) were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Emergency Preparedness

Green. An NRC-identified non-cited violation of 10 CFR 50.54(q) was identified for the failure to determine if the introduction or the increasing of air into the offgas flowpath for the purpose of reducing steam jet air ejector radiation monitor readings would reduce the effectiveness of the site Emergency Plan. The deficiency associated with this finding is that a 50.54(q) review was not performed to determine if there would be a potential reduction in the effectiveness of the site Emergency Plan because emergency action level classifications for both an Unusual Event and an Alert are based on radiation level readings from the steam jet air ejector radiation monitor. The procedure change which allowed the introduction of air into the offgas flowpath, and the implementation of the procedure on June 1, 2006 did not have associated 50.54(q) reviews.

The finding was greater than minor because it is associated with the Emergency Preparedness Cornerstone and potentially affected the program elements of 10 CFR 50.54(b)(4). The finding was of very low safety significance because the licensee performed an analysis of the potential affects of the range of airflow rates on the radiation monitor readings which demonstrated that the emergency action level values would not have been detrimentally affected (Section 4OA2.3).

Cornerstone: Barrier Integrity

Green. An NRC-identified non-cited violation of Technical Specification 5.4.1, Administrative Controls (Procedures), was identified for the failure to adhere to procedure requirements when operators injected service air into the steam jet air ejectors and the offgas flowpath. The initial condition that the service air injection was needed for continued hydrogen water chemistry operation was not met. As a result of this procedure adherence deficiency, the licensee had reduced the ability to monitor for actual fuel cladding damage. The licensee entered the issue into the corrective action program, secured air injection to the steam jet air ejector, and deleted the instructions which allowed service air injection to the steam jet air ejectors.

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This finding is more than minor because it involved adherence to procedures associated with fuel cladding integrity and affected the Barrier Integrity Cornerstone to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. The finding was determined to be of very low safety significance because it was only associated with the ability to monitor fuel barrier integrity. This finding was related to the cross-cutting area of Human Performance because the cause was due to failure to adhere to procedures (Section 4OA2.4).

B. Licensee Identified Violations

A violation of very low safety significance which was identified by the licensee was reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the Corrective Action Program. The violation and the licensee's corrective action tracking number are listed in Section 4OA7 of this report.

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REPORT DETAILS

Summary of Plant Status

Unit 1 began the report period at full power. On August 10, the unit commenced a reactor shutdown due to the detection of a main generator stator liquid cooling system leak. The unit entered Mode 4 (Cold Shutdown) on August 11 and commenced Forced Outage B116F1. Following repairs to the main generator, Unit 1 entered Mode 2 (Startup) on August 22 and achieved full power on August 27. The unit performed an unplanned downpower to approximately 50 percent on September 29 to facilitate repairs to the main condenser (A-South waterbox) which developed a tube leak. Following repairs, the unit returned to full power on September 30.

Unit 2 began the inspection period at full power. On August 13, the unit performed a planned downpower to approximately 75 percent to facilitate main turbine bypass valve testing and to perform a control rod sequence exchange. Unit 2 returned to full power later on August 13. On September 22, the unit performed a planned downpower to approximately 60 percent to facilitate main steam and main turbine valve testing and to perform fuel leak suppression testing due to the detection of a leaking fuel assembly. Following locating and suppressing the leaking fuel assembly, the unit returned to full power on September 27 where it stayed for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

During the approach of Tropical Storm Ernesto to the Cape Fear Region of North Carolina, the inspectors attended storm preparation status meetings, reviewed site preparations for adverse weather, and reviewed preparations for plant damage assessment. The inspectors toured risk-significant and susceptible plant areas to verify the implementation of adverse weather preparation procedures and compensatory measures before the onset of adverse weather conditions. From August 31 until September 1, 2006, the inspectors monitored plant response to the adverse weather, the licensee's damage assessment, the licensee's review of emergency response capabilities, and corrective actions as a result of Tropical Storm Ernesto. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

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1R04 Partial System Walkdowns

a. Inspection Scope

The inspectors performed three partial walkdowns of the below listed systems to verify that the systems were correctly aligned while the redundant train or system was inoperable or out-of-service (OOS) or, for single train risk significant systems, while the system was available in a standby condition. The inspectors assessed conditions such as equipment alignment (i.e., valve positions, damper positions, and breaker alignment) and system operational readiness (i.e., control power and permissive status) that could affect operability. The inspectors verified that the licensee identified and resolved equipment alignment problems that could cause initiating events or impact mitigating system availability. The inspectors reviewed Administrative Procedure ADM-NGGC-0106, Configuration Management Program Implementation, to verify that available structures, systems or components (SSCs) met the requirements of the configuration control program. Documents reviewed are listed in the Attachment.

- Unit 2 high pressure coolant injection when reactor core isolation cooling was OOS on July 26, 2006
- Unit 1 A loop of residual heat removal while in shutdown cooling mode on August 14-15, 2006
- Emergency diesel generator (EDG) #1 when EDG #2 was OOS on September 29, 2006

To assess the licensee's ability to identify and correct problems, the inspectors reviewed the following ARs:

- AR 203934, Unit 1 drywell radiation monitor restoration timeliness
- AR 201006, Unit 2 system parameter display system not updating plant information

b. Findings

No findings of significance were identified.

1R05 Quarterly Fire Protection

a. Inspection Scope

Fire Area Walkdowns

The inspectors reviewed action requests (ARs) and work orders (WOs) associated with the fire suppression system to confirm that their disposition was in accordance with Procedure 0AP-033, Fire Protection Program Manual. The inspectors reviewed the status of ongoing surveillance activities to verify that they were current to support the operability of the fire protection system. In addition, the inspectors observed the fire suppression and detection equipment to determine whether any conditions or

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deficiencies existed which would impair the operability of that equipment. The inspectors toured the following six areas important to reactor safety and reviewed the associated prefire plans to verify that the requirements for fire protection design features, fire area boundaries, and combustible loading were met. Documents reviewed are listed in the Attachment.

- Service Water Building 4' and 20' elevations (2 areas)
- EDG Cells #1, #2, #3 and #4, 23' elevation (4 areas)

b. Findings

No findings of significance were identified.

1R11 Quarterly Licensed Operator Requalification

a. Inspection Scope

The inspectors observed licensed operator performance and reviewed the associated training documents during simulator training sessions for training cycle 2006-05. The simulator observations and review included evaluations of emergency operating procedure and abnormal operating procedure utilization. The inspectors reviewed Procedure OTPP-200, Licensed Operator Continuing Training Program, to verify that the program ensures safe power plant operation. Simulator training scenarios were observed on September 26, 2006. The scenarios tested the operators' ability to diagnose and respond to various plant failures, abnormal operating transients, losses of power to various safety-related buses, and plant accidents. The inspectors reviewed operator activities to verify consistent clarity and formality of communication, conservative decision-making by the crew, appropriate use of procedures, and proper alarm response. Group dynamics and supervisory oversight, including the ability to properly identify and implement appropriate TS actions, regulatory reports, and notifications, were observed. The inspectors observed the crew self-critique and instructor feedback. The inspectors assessed whether appropriate feedback was planned to be provided to the licensed operators.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

For the two equipment issues described in the ARs listed below, the inspectors reviewed the licensee's implementation of the Maintenance Rule (10 CFR 50.65) with respect to the characterization of failures, the appropriateness of the associated Maintenance Rule a(1) or a(2) classification, and the appropriateness of the associated a(1) goals and

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corrective actions. The inspectors also reviewed operations logs and licensee event reports to verify unavailability times of components and systems, if applicable. Licensee performance was evaluated against the requirements of Procedure ADM-NGG-0101, Maintenance Rule Program. The inspectors also reviewed deficiencies related to the work activities associated with the ARs to verify that the licensee had identified and resolved deficiencies in accordance with Procedure CAP-NGGC-0200, Corrective Action.

- AR 198330, Unplanned Technical Specification (TS) Action entry due to control building air conditioner unit (2-VA-2D-CV-BD) failing to properly cool
- AR 201240, Unit 2 C conventional service water pump failed to deliver flow while in-service due to failed shaft coupling

To assess the licensee's ability to identify and correct problems, the inspectors reviewed the following ARs:

- AR 201177, Testing of Unit 2 B control rod drive pump power cables indicates replacement is required
- AR 201743, Failures of Zero Tolerance for Equipment Failure Important Rotating Equipment

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation

a. Inspection Scope

The inspectors reviewed the licensee's implementation of 10 CFR 50.65 (a)(4) requirements during scheduled and emergent maintenance activities, using Procedure OAP-025, BNP Integrated Scheduling and Technical Requirements Manual 5.5.13, Configuration Risk Management Program. The inspectors reviewed the effectiveness of risk assessments performed due to changes in plant configuration for maintenance activities (planned and emergent). The review was conducted to verify that, upon unforeseen situations, the licensee had taken the necessary steps to plan and control the resultant emergent work activities. The inspectors reviewed the applicable plant risk profiles, work week schedules, and maintenance WO's for the following six conditions involving OOS equipment:

- AR 200463, EDG #3 outage postponement due to predicted heavy loads on the electric distribution grid on July 17, 2006 (planned)
- AR 201240, Failure of Unit 2 C conventional service water pump with Unit 2 reactor core isolation cooling OOS on July 26, 2006 (emergent)
- AR 201700, EDG #1 declared inoperable due to failure of the engine temperature control valve to properly operate with the Unit 2 B nuclear service

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water pump OOS on July 31, 2006 resulting in an elevated risk (Yellow) condition (emergent)

- AR 202654, Unit 1 unplanned shutdown and outage as a result of a main generator stator liquid cooling water system leak on August 14, 2006 (emergent)
- AR 204331, Unit 1 reactor core isolation cooling system declared inoperable due to system flow controller failure on August 24, 2006 (emergent)
- WO 765392, Unit 1 A loop of residual heat removal/residual heat removal service water system and the Unit 2 A nuclear service water pump OOS for planned maintenance on August 10, 2006 (planned)

To assess the licensee's ability to identify and correct problems, the inspectors reviewed the following ARs:

- AR 201010, Improvement opportunity in site fuel leak management
- AR 207014, Unanticipated Unit 2 Limiting Condition for Operation due to reactor core isolation system containment isolation valve (2-E51-F007) failure

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the operability evaluations associated with the following six issues documented in the ARs listed below, which affected risk significant systems or components, to assess, as appropriate: 1) the technical adequacy of the evaluations; 2) the justification of continued system operability; 3) any existing degraded conditions used as compensatory measures; 4) the adequacy of any compensatory measures in place, including their intended use and control; and 5) where continued operability was considered unjustified, the impact on any TS limiting condition for operation and the risk significance. In addition to the reviews, discussions were conducted with the applicable system engineer regarding the ability of the system to perform its intended safety function.

- AR 200541, Unit 2 control room air conditioner failed to properly cool
- AR 201700, EDG#1 inoperable due to high lubricating oil temperature common cause evaluation
- AR 201240, Operability condition review of nuclear and conventional service water pumps as a result of the Unit 2 C conventional service water pump shaft coupling failure
- AR 200882, Unit 2 suppression pool inaccurate temperature indication due to safety/relief valve leakage
- AR 205241, Excess water content in EDG#2 air compressor #2
- AR 206089, EDG #3 leaking electric capacitor in excitation circuitry

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To assess the licensee's ability to identify and correct problems, the inspectors reviewed the following ARs:

- AR 204777, Unit 2 D residual heat removal service water pump motor outboard bearing high temperature
- AR 201785, Unit 1 primary containment venting not required

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing

a. Inspection Scope

For the five maintenance activities listed below, the inspectors reviewed the post-maintenance test procedure and witnessed the testing and/or reviewed test records to confirm that the scope of testing adequately verified that the work performed was correctly completed, and that the test demonstrated that the affected equipment was capable of performing its intended function and was operable in accordance with TS requirements. The inspectors reviewed the licensee's actions against the requirements in Procedure 0PLP-20, Post Maintenance Testing Program.

- WO 886014, Rebuild Unit 1 B nuclear service water pump
- WO 836850, Inspect and repack Unit 1 reactor core isolation cooling system cooling supply valve (1-E51-F046)
- WO 880144, Unit 1 suppression pool purge containment isolation valve (1-CAC-V22) failed to stroke closed during testing
- WO 887541, Corrective maintenance performed on EDG #1, temperature control valve (2-MOD-TCV-2129)
- WO 886012, Verify operation of Unit 1 C conventional service water pump

b. Findings

No findings of significance were identified.

1R20 Refueling and Other Outage Activities

a. Inspection Scope

.1 Unit 1 Maintenance Outage

The inspectors evaluated Unit 1 Forced Outage B116F1 which commenced on August 10, 2006, due to the detection of a main generator stator liquid cooling system leak. The unit entered Mode 4 (Cold Shutdown) on August 11. Following repairs to the main generator, Unit 1 entered Mode 2 (Startup) on August 22 and achieved full power on

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August 27. Documents reviewed are listed in the Attachment. The following specific areas were reviewed during the inspection period:

Outage Plan. The inspectors reviewed the outage plan to verify that the licensee had considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth.

Shutdown and Cooldown. The inspectors observed portions of the Unit 1 shutdown to enter the outage to verify that activities were in accordance with General Procedure OGP-5.0, Unit Shutdown. The inspectors verified that the licensee monitored cooldown restrictions by performing 1PT-01.7, Heatup/Cooldown Monitoring, to assure that TS cooldown restrictions were satisfied.

Licensee Control of Outage Activities. The inspectors observed and reviewed activities and plant conditions to verify that the licensee maintained defense-in-depth commensurate with the outage risk control plan. The inspectors reviewed the following specific items, as specified:

- Decay Heat Removal. The inspectors reviewed decay heat removal procedures and observed decay heat removal systems' parameters to verify proper removal of decay heat. The inspectors conducted main control room panel walkdowns and walked down portions of the systems in the plant to verify system availability.
- Reactivity Control. The inspectors observed licensee performance during the outage to verify that reactivity control was conducted in accordance with procedures and TS requirements.
- Electrical Power. The inspectors reviewed the following licensee activities related to electrical power during the refueling outage to verify that they were in accordance with the outage risk plan:
 - Controls over electrical power systems and components to ensure emergency power was available
 - Controls and monitoring of electrical power systems and components and work activities in the power transmission yard

Monitoring of Heatup and Startup Activities. The inspectors reviewed to verify, on a sampling basis, that TS, license conditions, and other requirements for mode changes were met prior to changing modes or plant configurations.

Identification and Resolution of Problems. The inspectors reviewed ARs to verify that the licensee was identifying problems related to outage activities at an appropriate threshold and entering them in the corrective action program. The inspectors reviewed the following issues identified during the outage to verify that the appropriate corrective actions were implemented or planned:

- AR 203580, Main steam isolation valve (1-B21-F028D) failed to stroke open
- AR 203616, Filter rack located in spent fuel pool tied to handrail

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- AR 203878, Unit 1 C residual heat removal pump seal cooler reduced flow rate
- AR 203629, High pressure coolant injection system exhaust vacuum breaker check valve failure

1R22 Surveillance Testing

.1 Routine Surveillance Testing

a. Inspection Scope

The inspectors either observed surveillance tests or reviewed test data for the four risk significant SSC surveillances, listed below, to verify the tests met TS surveillance requirements, UFSAR commitments, in-service testing (IST), and licensee procedural requirements. The inspectors assessed the effectiveness of the tests in demonstrating that the SSCs were operationally capable of performing their intended safety functions.

- OPT-02.3.1, Suppression Chamber to Drywell Vacuum Breakers Operability Test performed on Unit 1
- OPT-34.2.2.1, Fire Door, ASSD Access/Egress Door, Severe Weather Door Inspections, performed on Units 1 and 2
- 1 PT-24 1-1, Service Water Pump and Discharge Valve Operability Test, performed on Unit 1 B conventional service water pump
- OPT-12.2A, Number 1 Diesel Generator Monthly Load Test

To assess the licensee's ability to identify and correct problems, the inspectors reviewed the following ARs:

- AR 204333, Hydrogen-oxygen analyzers not placed in service during steam jet air ejector operation
- AR 207869, Unit 2 C residual heat removal pump differential pressure trend
- AR 202078, Unit 2 A standby liquid cooling subsystem inoperable due to discharge relief valve lifting at pressure lower than setpoint
- AR 201624, Unit 1 steam jet air ejector radiation monitor increase without obtaining sample

b. Findings

No findings of significance were identified.

.2 Inservice Surveillance Testing

a. Inspection Scope

The inspectors reviewed the performance of Periodic Test 1PT-24.1-1, Service Water Pump and Discharge Valve Operability Test, performed on Unit 1 B nuclear service water pump on August 10, 2006. The inspectors evaluated the effectiveness of the licensee's American Society of Mechanical Engineers (ASME) Section XI testing

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program to determine equipment availability and reliability. The inspectors evaluated selected portions of the following areas: 1) testing procedures; 2) acceptance criteria; 3) testing methods; 4) compliance with the licensee's IST program, TS, selected licensee commitments, and code requirements; 5) range and accuracy of test instruments; and 6) required corrective actions. The inspectors also assessed any applicable corrective actions taken.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed Operating Manual 0PLP-22, Temporary Changes, to assess the implementation of Engineering Procedure 2ENP-63.1, Configuration of the Unit 2 Turbine Building Ventilation System for Test of Once Through Operation, Rev. 0, which was placed in service on August 12, 2006. The inspectors reviewed the temporary modification to verify that the modification was properly installed, did not adversely affect offsite effluent releases, and implemented appropriate controls for securing the test configuration when appropriate.

To assess the licensee's ability to identify and correct problems, the inspectors reviewed the following Corrective Action Program (CAP) documents:

- AR 203492, Once-through ventilation 10CFR50.59 review concerns
- AR 203069, Unexpected re-alignment of turbine building ventilation
- AR 203050, Spill of potentially contaminated water in the Unit 1 high pressure coolant injection system room

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed a site emergency preparedness training drill/simulator scenario conducted on September 12, 2006. The inspectors reviewed the drill scenario narrative to identify the timing and location of classifications, notifications, and protective action recommendations development activities. The inspectors evaluated the drill conduct from the control room simulator, technical support center, and the emergency operations facility. During the drill, the inspectors assessed the adequacy of event

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classification and notification activities. The inspectors observed portions of the licensee's post-drill critiques at the technical support center and emergency operating facility. The inspectors verified that the licensee properly evaluated the drill's performance with respect to performance indicators and assessed drill performance with respect to drill objectives. To assess the ability of the licensee to identify and correct problems, the inspectors reviewed the following corrective action documents that were generated as a result of the drill:

- AR 206307, Simulator Crew Improvements
- AR 206314, Technical Support Center
- AR 206327, Emergency Operating Facility Improvements
- AR 206335, Operations Support Center Improvements

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstones: Occupational Radiation Safety and Public Radiation Safety

2OS1 Access Control To Radiologically Significant Areas

a. Inspection Scope

Access Controls. The inspectors reviewed and evaluated licensee guidance and its implementation for controlling and monitoring worker access to radiologically significant areas and tasks associated with Unit 1 (U1) and Unit 2 (U2) operations. The inspectors evaluated changes to and adequacy of procedural guidance; directly observed implementation of established administrative and physical radiation controls; appraised occupational worker and health physics technician (HPT) knowledge of and proficiency in implementing radiation protection (RP) activities; and assessed occupational worker exposures to radiation and radioactive material.

The inspectors directly observed controls established for workers and HPT staff involved in works or tasks associated with actual or potential airborne radioactivity area, radiation area, high radiation area (HRA), locked high radiation area (LHRA), and very high radiation area (VHRA) conditions. Controls and their implementation for LHRA keys and for storage of irradiated material within the U2 Tip room were reviewed and discussed in detail. Established radiological controls were evaluated for selected tasks including work conducted on the U2 Tip room (e.g., Tip detector change) and U1 Spent Fuel Pool (SPF) cleanup project. In addition, licensee controls for areas where dose rates could change significantly as a result of plant operations were reviewed and discussed (e.g., U2 Steam Jet Air Ejector (SJAЕ) radiation monitor). For selected tasks, the inspectors attended pre-job briefings and reviewed radiation work permit (RWP) details to assess communication of radiological control requirements to workers. Occupational workers' adherence to selected RWPs and HPT proficiency in providing job coverage were

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evaluated through direct observations and interviews with licensee staff. Worker exposure as measured by electronic dosimeter was reviewed and assessed independently.

The inspectors inspected the U1/U2 SFP area to determine if there were appropriate controls applied to materials and equipment stored in the pool. The inspectors also reviewed the inventory of items stored in the pool.

During facility tours within the radiologically controlled area (RCA), the inspectors observed and evaluated postings and physical controls established for access to the U1 and U2 reactor buildings; selected control building locations/equipment; and selected turbine-building locations/equipment. The inspectors independently measured radiation dose rates associated with selected U1/U2 reactor buildings and radioactive waste processing areas/equipment. Results were compared to current licensee surveys and assessed against established postings and radiation controls.

The inspectors evaluated implementation and effectiveness of licensee controls for both airborne and external radiation exposure. Effectiveness of external radiation exposure controls was evaluated through review and discussions of individual worker dose as measured by electronic dosimeter for selected tasks.

RP activities were evaluated against Updated Final Safety Analysis Report (UFSAR), Technical Specifications (TS), and 10 Code of Federal Regulations (CFR) Parts 19 and 20 requirements. Specific assessment criteria included UFSAR Section 12, Radiation Protection; 10 CFR 19.12; 10 CFR 20, Subparts B, C, F, G, H, and J; TS Sections 5.4, Procedures and 5.7, High Radiation Area; and approved licensee procedures. Licensee guidance documents, records, and data reviewed within this inspection area are listed in Section 2OS1 of the report Attachment.

Problem Identification and Resolution. Licensee Corrective Action Program (CAP) documents and Action Requests (ARs) associated with access control to radiologically significant areas were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with procedure CAP-NGGC-0200, Corrective Action Program, and CAP-NGGC-0206, Corrective Action Program Trending and Analysis. In addition, the inspectors reviewed the last two self-assessments conducted in regard to access controls (Assessment No. 81344, dated February 2003; Assessment No. 140125, dated August 2005). Licensee CAP documents associated with access control issues, personnel radiation monitoring, and personnel exposure events reviewed and evaluated during inspection of this program area are identified in Section 2OS1 of the report Attachment.

The inspectors completed 21* of the required 21 samples for Inspection Procedure (IP) 71121.01.

* This number includes an inspection credit of 25% towards the required samples in IP 71121.01 based on the Brunswick 2005 OSART ROP Baseline Inspection Crediting Plan, Rev.1, dated April 27, 2005.

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b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation and Protective Equipment

a. Inspection Scope

Radiation Monitors and Protective Equipment. The inspectors reviewed the operability and maintenance of selected radiation detection and respiratory protective equipment. The inspection consisted of document review, discussions with plant personnel, and observation of routine testing for Area Radiation Monitors (ARMs), Continuous Air Monitors (CAMs), Personnel Contamination Monitors (PCMs), portable radiation detection instruments, and Self-Contained Breathing Apparatus (SCBA).

The inspectors reviewed calibration records for ARMs and CAMs and interviewed cognizant HPT and Instrument and Control representatives regarding the results. The placement and use of CAMs at various locations throughout the plant was evaluated and discussed with cognizant licensee representatives.

Whole Body Counter (WBC) calibration records and daily source check trends were reviewed by the inspectors and discussed with cognizant dosimetry personnel. In addition, the inspectors observed a WBC daily source check.

Procedural guidance for the use and calibration of portable survey instruments was evaluated by the inspectors. The inspectors observed the daily source check of an RO-2A and Teletector survey meters and compared the results to specified instrument tolerances. The inspectors interviewed cognizant licensee representatives regarding the program for the use of electronic dosimeters (including use in high noise areas). In addition, calibration records were reviewed for Teletector and other survey meters that were in use at the time of the inspection.

The licensee's respiratory protection program guidance and its implementation for SCBA use were evaluated by the inspectors and discussed with cognizant licensee representatives. The number of available SCBA units and their general material and operating condition were observed during tours of the Control Room, Reactor Building, and the Operations and Maintenance Building (staged for use in the Operations Support Center). Current records associated with supplied air quality for staged SCBA equipment were evaluated by the inspectors. In addition, the inspectors interviewed select control room operators to determine their level of knowledge of available SCBA equipment storage locations, and availability of prescription lens inserts, if required. Procedures and training for performing an SCBA bottle change out were also reviewed by the inspectors and discussed with cognizant licensee personnel.

Program guidance, performance activities, and equipment material condition were reviewed against details documented in 10 CFR Parts 20 and 50; UFSAR Section 12.3.4, Area Radiation Monitoring; applicable sections of NUREG-0737, Clarification of

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Three Mile Island (TMI) Action Plan Requirements, November 1980; Regulatory Guide (RG) 1.97, Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident, Rev. 3; RG 8.15, Acceptable Programs for Respiratory Protection, Rev. 1; and applicable licensee procedures. All documents reviewed are listed in Section 2OS3 of the report Attachment.

Problem Identification and Resolution. Issues identified through Health Physics departmental self-assessments and CAP documents associated with radiation monitoring instrumentation and SCBA were reviewed and discussed with cognizant licensee representatives. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve selected issues in accordance with the procedure CAP-NGGC-0200. Special assessments and ARs reviewed and evaluated in detail for this inspection area are identified in Section 2OS3 of the report Attachment.

The inspectors completed 9* of the required 9 samples for IP 71121.03.

* This number includes an inspection credit of 25% towards the required samples in IP 71121.03 based on the Brunswick 2005 OSART ROP Baseline Inspection Crediting Plan, Rev.1, dated April 27, 2005.

b. Findings

No findings of significance were identified.

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

a. Inspection Scope

Effluent Processing Equipment. The inspectors reviewed and evaluated the operability, availability, and reliability of selected radioactive effluent process sampling and detection equipment used for routine and accident monitoring activities. Inspection activities consisted of direct observation of installed equipment configuration and operation and review of calibration and performance data for the liquid and gaseous effluent process systems.

The inspectors walked-down, accessible sections of the liquid waste system including waste monitor tanks, system piping, and radioactive waste liquid effluent monitor equipment and assessed the material condition and configuration against current system design diagrams. The inspectors walked down components of the main gaseous effluent process and release system included the parts of the plant vent radiation monitoring system along with associated sample lines. The inspectors interviewed cognizant chemistry and system engineering personnel regarding liquid and gaseous radwaste system configurations, system reliability, system modifications, and effluent monitor operation. During the walkdown of the rad waste processing building, the rad waste operator was interviewed to identify any operational issues that might

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exist with the systems. The inspectors reviewed the most recent hold up testing of the waste gas processing system.

The inspectors reviewed applicable sections of licensee effluent monitor calibration procedures and evaluated results of calibration and/or functional tests for the radwaste liquid effluent monitor and its associated flow monitor, the main stack radiation monitor, the U1 and U2 reactor building roof vent samplers, the turbine building vent monitor, the process gas (noble gas) effluent monitor, and the high efficiency particulate (HEPA) filter systems. Reviewed data included isotopic calibration records, source check results, flowmeter calibration records, and HEPA surveillance records. The inspectors also reviewed out-of-service data and contingency sampling records for selected effluent monitors for the period of January 2004 - June 2006.

The inspectors reviewed the site ground water protection efforts which included documentation from the site decommissioning records that are maintained pursuant to 10CFR50.75(g). During the review, the past and present ground water protection activities were discussed with appropriate Chemistry personnel. Records of historical spills and structures that had potential to contaminate groundwater and the subsequent mitigation actions taken were reviewed and discussed. The locations of various sampling wells and the sample results were discussed. The inspectors compared the hydrological data in the UFSAR with the data generated during a hydrological study performed in 1994.

Installed configuration, material condition, operability, and reliability for selected effluent sampling and monitoring equipment were reviewed by the inspectors against details documented in the following: 10 CFR Part 20; RG 1.33, Quality Assurance Program Requirements (Operation), February 1978; RG 1.21, Measuring, Evaluating and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water Cooled Nuclear Power Plant, June 1974; ANSI-N13.1-1969, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities; ANSI-N13.10-1974, ANS Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents; TS Section 5.6.3; the Offsite Dose Calculation Manual (ODCM), Rev. 26; and UFSAR Chapters 9 and 11. Procedures and records reviewed during the inspection are listed in Section 2PS1 of the report Attachment.

Effluent Release Processing and Quality Control Activities. The inspectors evaluated the licensee's performance in conducting effluent release processing and Quality Control (QC) activities including implementation of program guidance and chemistry staff proficiency. The inspection consisted of interviews of cognizant chemistry staff and supervision and observation of a chemistry staff member demonstrating the normal processing of routine release logging/permitting. The review included release documentation and applicable licensee procedures. The inspectors reviewed samples of calibration and quarterly quality assurance data for the High Purity Germanium and the liquid scintillation detectors. The inspection included a review of the quarterly radiochemistry cross comparison program print outs for CY 2005.

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The effluent release program was evaluated against the following guidance: 10 CFR Part 20 and Appendix I to 10 CFR Part 50; ODCM; RG 1.21, RG 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operation) - Effluent Streams and the Environment, December 1977; and RG 1.109, Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50 Appendix I, October 1977. Procedures and records reviewed during the inspection are listed in Section 2PS1 of the report Attachment.

Problem Identification and Resolution. Four licensee ARs and two audits associated with effluent release activities were reviewed and assessed. Two legacy condition reports from 1994 and 1997 were also reviewed during evaluation of groundwater protection activities. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with procedure CAP-NGGC-0200. Documents reviewed are listed in Section 2PS1 of the report Attachment.

The inspectors completed 11* of the required 11 samples for IP 71122.01.

* This number includes an inspection credit of 25% towards the required samples in IP 71122.01 based on the Brunswick 2005 OSART ROP Baseline Inspection Crediting Plan, Rev.1, dated April 27, 2005.

b. Findings

No findings of significance were identified.

2PS3 Radiological Environmental Monitoring Program (REMP) and Radioactive Material Control Program

a. Inspection Scope

REMP Implementation. The inspectors reviewed and discussed with cognizant licensee representatives the results published in the Brunswick Annual Radiological Environmental Operating report for CY 2005. The inspectors observed the collection and preparation of weekly particulate and radioiodine samples by licensee personnel and assessed material condition of select air sampling stations and thermoluminescent dosimeters (TLD) to evaluate procedural compliance. Calibration stickers were reviewed by the inspectors on select air sampling pumps observed in the field. The inspectors also verified that the collection station locations were within the sectors specified in the ODCM using NRC global positioning system. The inspectors observed and discussed with cognizant licensee representatives the procedures, methods, and equipment used to perform vegetation, sediment, and fish/invertebrate sampling. The inspectors reviewed and discussed with cognizant licensee representatives the procedures used to calibrate and determine the lower limit of detection (LLD) for environmental sample gamma spectroscopy analysis.

Enclosure

REMP guidance, implementation, and results were reviewed against the ODCM and applicable procedures listed in Section 2PS3 of the report Attachment.

Meteorological Monitoring Program. The inspectors observed, reviewed and discussed with cognizant licensee representatives the operability of the meteorological monitoring equipment and operator access to meteorological data. A tour of the current meteorological monitoring equipment was conducted with the system engineer. In addition, the inspectors reviewed the performance and calibration records of these instruments. Licensee technicians primarily responsible for equipment maintenance and surveillance were interviewed by the inspectors concerning equipment performance, reliability, and routine inspections. At the time of the onsite inspection, the inspectors observed and discussed with cognizant instrument technicians repairs being made to the upper wind speed and direction sensors. The inspectors verified meteorological data received at the control room against the integrated meteorological data transmitted by the tower station.

Meteorological instrument operation, calibration, and maintenance were reviewed against details listed in UFSAR, Chapter 2; NRC Safety Guide 23, Onsite Meteorological Programs-1972; ANSI -3.11-2000, Determining Meteorological Information; RG 1.21; RG 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operation) - Effluent Streams and the Environment, December 1977; and applicable licensee procedures. Documents reviewed are listed in Section 2PS3 of the report Attachment.

Unrestricted Release of Materials from the RCA. The inspectors reviewed calibration records for select PCMs and material release monitors. The inspectors also observed source checking of selected material survey monitors. Types of sources used for checks and minimum detectable activities were discussed with an instrument technician.

Radiation protection program activities associated with the unconditional release of potentially contaminated materials from the main RCA and Control Room exits were evaluated. Operability and analysis capabilities of the licensee's Small Article Monitor (SAM) instruments used at these egress exits were reviewed and evaluated. In addition, responsible staff's knowledge and proficiency regarding SAM instrument calibration activities were evaluated through interviews, record reviews, and direct observations of plant activities. For selected SAM instruments, current calibration and recent operational/performance test surveillance data were observed and evaluated. For selected SAM instruments located at the main RCA exit and the Control Room entrances, the inspectors directly observed equipment responses to mixed plant-specific radioactive sources positioned at various orientations and distances from the individual detectors to simulate potential contamination.

The inspectors verified that radiation detection sensitivities were consistent with NRC guidance in IE Circular 81-07, Control of Radioactively Contaminated Material, May 14, 1981, and IE Information Notice 85-92. Documents reviewed are listed in Section 2PS3 of the report Attachment.

Enclosure

Problem Identification and Resolution. Licensee corrective action program documents associated with REMP operations and with the unrestricted release of materials from the RCA were reviewed and evaluated. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with the licensee's procedure CAP-NGGC-0200, Corrective Action Program, Rev. 17. Documents reviewed are listed in Section 2PS3 of the report Attachment.

The inspectors completed 10* of the required 10 samples for IP 71122.03

* This number includes an inspection credit of 25% toward the required samples in IP 71121.01 based on the Brunswick 2005 OSART ROP Baseline Inspection Crediting Plan, Rev.1, dated April 27, 2005.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification

a. Inspection Scope

The inspectors sampled licensee data for the performance indicators (PIs) listed below. To verify the accuracy of the PI data reported during the period reviewed, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Indicator Guideline," Rev. 4, were used to verify the basis for each data element.

Occupational Radiation Safety (OS) Cornerstone. To evaluate the Occupational Exposure Control Effectiveness PI the inspectors reviewed data collected from April 2005 through June 2006. For the reviewed period, the inspectors assessed CAP records to determine whether HRA, VHRA, or unintended radiation exposures, resulting in TS or 10 CFR 20 non-conformances, had occurred. In addition, the inspectors reviewed selected personnel contamination event data, internal dose assessment results, and ED alarms associated with dose rates exceeding 1 rem/hr and cumulative dose rates exceeding established set-points from April 2005 through July 2006. Reviewed documents relative to this PI are listed in Sections 2OS1, 2OS2, and 4OA1 of the report Attachment.

Public Radiation Safety (PS) Cornerstone. To evaluate the Radiological Effluent Technical Specification/Offsite Dose Calculation Manual Radiological Effluent Occurrences PI the inspectors reviewed data from January 2005 through July 2006. The inspectors reviewed documents listed in Section 4OA1 of the report Attachment. In addition, the inspectors reviewed out-of-service effluent monitor logs and six effluent release permits.

Enclosure

The inspectors completed two of the required samples for IP 71151. One sample for the OS Performance Indicator and one sample for the PS Performance Indicator.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

.1 Routine Review of ARs

To aid in the identification of repetitive equipment failures or specific human performance issues for followup, the inspectors performed frequent screenings of items entered into the licensee's Corrective Action Program (CAP). The review was accomplished by reviewing daily ARs.

.2 Annual Sample Review

a. Inspection Scope

The inspectors performed an in-depth annual sample review of the below-listed issues as documented in licensee corrective action documents to verify that conditions adverse to quality were addressed in a manner that was commensurate with the safety significance of the issue. The inspectors reviewed the actions taken to verify that the licensee had adequately addressed the following attributes:

- Complete, accurate, and timely identification of the problem
- Evaluation and disposition of operability and reportability issues
- Consideration of previous failures, extent of condition, generic or common cause implications
- Prioritization and resolution of the issue commensurate with the safety significance
- Identification of the root cause and contributing causes of the problem
- Identification and implementation of corrective actions commensurate with the safety significance of the issue

The inspectors reviewed the following two issues:

- AR 201240, Unit 2 C conventional service water pump failed while in-service on July 26, 2006
- AR 176181, Improper maintenance rule scoping and maintenance on emergency operating procedure components

b. Findings and Observations

Enclosure

No findings of significance were identified.

.3 (Closed) Unresolved Item (URI) 05000325,324/2006003-02: Potential Reduction in Effectiveness of Emergency Plan.

Introduction.

A Green NCV of 10 CFR 50.54(q) was identified by the NRC regarding a 50.54(q) review that was not performed to determine if the introduction or the increasing of air into the offgas flowpath for the purpose of reducing steam jet air ejector (SJAЕ) radiation monitor readings would be a potential reduction in the effectiveness of the site Emergency Plan.

Description.

On May 30, 2006, the main condenser offgas system experienced increased radiation levels during power accession following the Unit 2 midcycle refueling outage B217M1. The cause of the increased radiation levels was due to previous operation with leaking fuel assemblies. Radiation levels are measured by SJAЕ radiation monitors 2-D12-RM-K601 A&B, located at the outlet of the SJAЕ after-condensers. Radiation levels are a function of the concentration of radio-isotopes present in the sample chamber. The level of readings depend on many factors including reactor coolant system activity, the amount of hydrogen being injected into the reactor coolant system, reactor power level, and the concentration of non-radioactive gases (e.g., oxygen and nitrogen). A high alarm on the radiation monitors requires investigation and entry into Emergency Operating Procedure (EOP) 0EOP-04-RRCP, Radioactivity Release Control Procedure. Additionally, emergency action levels (EALs) for an Unusual Event are based on readings from the SJAЕ (i.e., >12, 000 mr/hr or an increase of 100,000 μ ci/sec within a 30 minute time period for an Unusual Event) and for an Alert based on readings from the SJAЕ (i.e. >120,000 mr/hr for an Alert) and are used to address abnormal core conditions and core damage.

On June 1, 2006, operators utilized Section 8.9 of Operating Procedure (OP) 2OP-30, Condenser Air Removal and Off-gas Recombiner System, to inject into the SJAЕs, so that the increased flow past the radiation monitors would dilute the concentration of activity and reduce the number of "false-fuel-failure" alarms.

The introduction of air into the offgas flowpath has the effect of reducing SJAЕ radiation monitor readings. This change appears to have potentially reduced the effectiveness of the site Emergency Plan because EAL classifications for both an Unusual Event and an Alert are based on radiation level readings from the SJAЕ radiation monitor. The safety screen for Special Procedure (SP) 0SP-97-004 stated that the change to inject service air to the offgas flowpath did not involve a change to the previously accepted Emergency Plan. Procedural steps to inject service air were later incorporated into OP 2OP-30 , the corresponding Unit 1 procedures OP 1OP-30, and SP 0SP-97-004 was

Enclosure

cancelled. The licensee entered the failure to address the procedure change effects on the Emergency Plan into the CAP as AR 196254.

Analysis.

The deficiency associated with this event is that a 50.54(q) review was not performed to determine if there would be a potential reduction in the effectiveness of the site Emergency Plan because EAL classifications for both an Unusual Event and an Alert are based on radiation level readings from the SJAЕ radiation monitor. The procedure change for OP 1/2OP-30, which allowed the introduction of air into the offgas flowpath, and the implementation of the procedure on June 1, 2006 on Unit 2, did not have associated 50.54(q) reviews. The finding was greater than minor because it is associated with the Emergency Preparedness Cornerstone and potentially affects the program elements of 10 CFR 50.54(b)(4). The finding was of very low safety significance because the licensee performed an analysis of the potential effects of the range of airflow rates on the radiation monitor readings which demonstrated that the EAL values would not have been exceeded.

Enforcement.

10 CFR 50.54(q), in part, states that a licensee authorized to possess and operate a nuclear power reactor shall follow and maintain in effect emergency plans which meet the standards in § 50.47(b) and the requirements in Appendix E of this part. The nuclear power reactor licensee may make changes to these plans without Commission approval only if the changes do not decrease the effectiveness of the plans and the plans, as changed, continue to meet the standards of § 50.47(b) and the requirements of Appendix E to this part. 10 CFR 50.47 (2)(b)(4) states that a standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee, and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures.

Contrary to the above, the licensee did not determine if the introduction of air into the offgas flowpath for the purpose of reducing SJAЕ radiation monitor readings would reduce the effectiveness of the site Emergency Plan and EAL classifications for both an Unusual Event and an Alert. Because this failure is of very low safety significance and has been entered into the CAP (AR 196254), this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000325, 324/2006004-01, Potential Reduction in Effectiveness of Emergency Plan.

- .4 (Closed) URI 05000325,324/2006003-03: Failure to Follow Condenser Air Removal and Off-gas Recombiner System Procedure.

Introduction.

Enclosure

A Green NRC-identified NCV of TS 5.4.1, Administrative Controls (Procedures), was identified for failure to follow a condenser air removal and off-gas system operating procedure.

Description.

As discussed above in 4OA2.3, during power ascension following the Unit 2 midcycle refueling outage B217M1, the main condenser offgas system experienced increased radiation levels during power ascension. This resulted in high alarms on the SJAЕ radiation monitors which required entries into 0EOP-04-RRCP, Radioactivity Release Control Procedure.

On June 1, 2006, power ascension was secured based on SJAЕ radiation monitor levels increasing with reactor power increases. Operators projected that the high alarm setpoint would again be reached prior to attaining full power. A focus team was formed to address the issue. At the recommendation of the focus team, operators utilized Section 8.9 of OP 2OP-30, Condenser Air Removal and Off-gas Recombiner System, to inject service air into the SJAЕs, so that the increased flow past the radiation monitors would dilute the concentration of activity and reduce the number of "false-fuel-failure" alarms. However, the inspectors found that an initial condition of OP 2OP-30, Section 8.9, that service air injection to the SJAЕs was needed for continued hydrogen water chemistry, was not met in this case. Sufficient condenser air in-leakage was present to provide enough oxygen for hydrogen recombination. The inspectors determined that as a result of this procedure adherence deficiency, in addition to reducing the number of "false-fuel-failure" alarms, the licensee had reduced the ability to monitor for actual fuel cladding damage. The licensee subsequently raised the setpoint of the radiation monitors, secured service air injection to the SJAЕs, and entered this failure to follow procedure into the CAP as AR 196365. Subsequently, the licensee deleted the instructions to inject service air into the SJAЕs from OP 1/2OP-30.

Analysis.

The failure to meet the initial conditions of 2OP-30 during implementation on June 1, 2006, is more than minor because it involved adherence to procedures associated with fuel cladding integrity and affected the Barrier Integrity Cornerstone to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. This NRC-identified finding was determined to be of very low safety significance because it was only associated with the ability to monitor fuel barrier integrity. This finding was related to the cross-cutting area of Human Performance because the cause was due to failure to adhere to procedures.

Enforcement.

TS 5.4.1.a requires that written procedures shall be implemented covering applicable procedures recommended in Regulatory Guide 1.33, Appendix A, November 1972. Regulatory Guide 1.33 requires written procedure for the air extraction and offgas

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system. OP 2OP-30, Condenser Air Removal and Off-gas Recombiner System, Rev. 76, Section 8.9, contained instructions related to the injection of service air into the steam jet air ejectors and specified an initial condition that the service air injection was needed for continued hydrogen water chemistry operation.

Contrary to OP 2OP-30, on June 1, 2006, service air was injected into the Unit 2 steam jet air ejectors without being needed for continued hydrogen water chemistry operation. This resulted in the reduction of the ability to monitor for fuel cladding integrity. Because this finding is of very low safety significance and has been entered into the CAP (AR 196365), this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000325/2006004-02, Failure to Follow Condenser Air Removal and Off-gas Recombiner System Procedure.

4OA3 Event Follow-up

.1 Personnel Performance during Plant Evolutions

a. Inspection Scope

The inspectors observed and/or reviewed the following abnormal plant condition and plant transient to assess operator performance during non-routine evolutions and events. Operator logs, plant computer data, and associated operator actions were reviewed as well as the appropriate procedures:

- Operators entered Abnormal Operating Procedure 0AOP-19, Conventional Service Water System Failure, due to failure of the Unit 2 C conventional service water pump on July 26, 2006
- Unit 1 unplanned shutdown due to main generator stator liquid cooling system leak on August 10-11, 2006

b. Findings

No findings of significance were identified.

4OA5 Other

Temporary Instruction (TI) 2515/169-Mitigating Systems Performance Index Verification

a. Inspection Scope

The inspectors reviewed the licensee's implementation of Mitigating System Performance Index (MSPI) in accordance with the TI for the following boiling water reactor systems: 1) Emergency AC; 2) High pressure coolant injection; 3) Heat removal (reactor core isolation cooling); 3) Residual heat removal; and 4) Cooling water support systems. The review was performed to validate, on a sampling basis, that the licensee properly accounted for the unavailability and unreliability input data to the MSPI basis document and to verify accuracy of the first reporting results for the second quarter

Enclosure

2006 reporting period. During the review, the inspectors utilized the guidance contained in NEI 99-02, Revision 4, Regulatory Assessment Performance Indicator Guideline. The inspectors interviewed system engineers and reviewed Brunswick's MSPI basis document (BNP-PSA-069, NRC Mitigating System Performance Index Basis Document, Revision 0), surveillance procedures, operator logs, maintenance records, and the licensee's maintenance rule database in performing the review.

Information related to the licensee's implementation of MSPI gathered while completing this TI was forwarded to the Office of Nuclear Reactor Regulation for review.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On October 12, 2006, the resident inspectors presented the inspection results to Mr. T. Cleary and other members of his staff. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

4OA7 Licensee Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which met the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for disposition as a non-cited violation (NCV).

TS 5.4.1 requires the licensee to implement the procedures recommended by Regulatory Guide 1.33, Appendix A, November 1972, which includes procedures for the control of radioactivity. Administrative Instruction Procedure 0AI-112, Control of Materials in Spent Fuel Pool, Rev. 17, contains instructions related to the control of material suspended from spent fuel pool curb brackets or railing. 0AI-112 requires that materials suspended in the spent fuel pool that have dose rates equal to or greater than 1 R/Hr or more at 30 centimeters or 1 R/Hr or more on contact in water must be tagged and must be suspended from a curb bracket so that they cannot be pulled to the surface without tools. Contrary to 0AI-112, on August 11, 2006, the licensee discovered that a rope attached to a spent fuel pool filter rack containing filters in excess of the 0AI-112 limits was tied to the readily accessible Unit 1 spent fuel pool handrail. The condition was discovered by radiological control technician during the performance of duties. This event is documented in the licensee's CAP as AR 203616. This finding is of very low safety significance because there were no overexposures, no substantial potential for overexposure, and no loss of ability to assess dose.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

G. Atkinson, Supervisor - Emergency Preparedness
L. Beller, Supervisor - Licensing/Regulatory Programs
A. Brittain, Manager - Security
T. Cleary, Director - Site Operations
E. O'Neil, Manager - Training Manager
M. Grantham, Manager (Acting) - Engineering
D. Griffith, Manager - Outage and Scheduling
L. Grzeck, Lead Engineer - Technical Support
S. Howard, Manager - Maintenance
R. Ivey, Manager - Site Support Services
A. Pope, Manager - Operations
S. Rogers, Manager - Nuclear Assessment
J. Scarola, Site Vice President
T. Trask, Manager - Engineering
M. Turkal, Lead Engineer - Technical Support
M. Williams, Manager - Operations Support
B. Waldrep, Plant General Manager

NRC Personnel

B. Desai, Chief (Acting), Reactor Projects Branch 4, Division of Reactor Projects Region II

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSEDOpened

None

Opened and Closed

05000325,324/2006004-01	NCV	Potential Reduction in Effectiveness of Emergency Plan (Section 4OA2.3)
05000325/2006004-02	NCV	Failure to Follow Condenser Air Removal and Off-gas Recombiner System Procedure (Section 4OA2.4)

Closed

05000325,324/2006003-02	URI	Potential Reduction in Effectiveness of Emergency Plane (Section 4OA2.3)
05000325,324/2006003-03	URI	Failure to Follow Condenser Air Removal and Off-gas Recombiner System Procedure (Section 4OA2.4)
Temporary Instruction 2515/169	TI	Mitigating Systems Performance Index Verification (Section 4OA5)

Discussed

None

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Plant Operating Manual (POM), Volume XIII, Plant Emergency Procedure 0PEP-02.1, Initial Emergency Actions, Rev. 50

POM, Volume XIII, Plant Emergency Procedure 0PEP-02.6, Severe Weather, Rev. 9

POM, Volume I, Administrative Instruction, 0AI-68, Brunswick Nuclear Plant Response to Severe Weather Warnings, Rev. 26

POM, Volume XXI, Abnormal Operating Procedure, 0AOP-13.0, Operation during Hurricane, Flood Conditions, Tornado, or Earthquake, Rev. 36

Section 1R04: Equipment Alignment

POM, Volume III, Operating Procedure 2OP-19, High Pressure Coolant Injection System Operating Procedure, Rev. 105

POM, Volume III, Operating Procedure 1OP-17, Residual Heat Removal System Operating Procedure, Rev. 86

POM, Volume III, Operating Procedure 0OP-50.1, Diesel Generator Emergency Power System Operating Procedure, Rev. 65

Section 1R05: Fire Protection

POM, Volume XIX, Prefire Plan, 0PFP-PBAA, Power Block Auxiliary Areas Prefire Plans (SW,RW, AOG, TY, EY), Rev. 9

Section 1R20: Refueling and Other Outage Activities

POM, Volume IV, General Operating Procedure, 0GP-02, Approach to Criticality and Pressurization of the Reactor, Rev. 84

POM, Volume IV, General Operating Procedure, 0GP-03, Unit Startup and Synchronization, Rev. 67

POM, Volume IV, General Plant Operating Procedure, 0GP-05, Unit Shutdown, Rev. 125

POM, Volume IV, General Plant Operating Procedure, 0GP-12, Power Changes, Rev. 44

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 Form 1, Bicron Micro Rem Meter Calibration Record, Serial Number (S/N) 1472, 02/03/06
 Form 4, Eberline ASP-1 with NRD Probe Calibration Record, S/N 1212, 05/08/06
 Form 5, Eberline RM-14 Calibration Record, S/N 3753, 12/04/05
 Form 6, Eberline RO-2, RO-2A, & RO-20 Calibration Record, RO-2, S/N 2828, 09/02/05
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 Laboratory Report, Compressed Air/Gas Quality Testing, Report Nos. 51916-0, 51917-0, and 51918-0, dated 08/01/06, 08/02/06, and 08/01/06, respectively
 0E&RC-0116, Rev. 1, Calibration Record for Eberline PM-7, S/N 368, 06/27/06
 0E&RC-0171, Rev. 8, Efficiency Calibration of BC-4 Counter, S/N 888, 05/17/06
 0E&RC-0309, Rev. 11, Calibration Data, CAM No. 27, 11/22/05
 0E&RC-0310, Rev. 17, CAM Calibration Data Sheets, CAM Nos. 14, 20 and 29, dated 09/20/05, 04/19/06 and 05/04/06, respectively
 0E&RC-0344, Rev. 6, APTEC PMW Calibration Data Sheet, PMW S/N 9412008, 01/04/06
 SCBA Inventory List, July 06
 Work Order Package Nos. 00329829 01 and 00347197 01, Calibration of Area Radiation Monitors with Power Supply 1-D22-ES-K603C and 2-D22-ES-K603B, dated 06/17/04 and 05/04/05, respectively
 Work Order Package No. 00461128 01, AMI Post Accident High Range Radiation Monitor One Point Calibration Check, 03/16/05
 AR No. 00174887, BC-4 S/N 365 failed the nightly source check on 11/02/05
 AR No. 00205031, During an inspection of respirators in the Control Room Emergency Kits, several respirators were discovered stored in a manner which serve to disfigure the seal, 08/31/06
 Self-Assessment Report No. 142353, Radiation Protection Instrumentation

Section 2PS1: Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

0E&RC-1700, Verification of Analytical Performance, Rev. 21
 0E&RC-2003, Reporting of Radioactive Airborne Effluent Releases, Rev. 25
 0E&RC-2009, Radioactive Liquid Effluent Releases and Reports, Rev. 21
 0E&RC-2200, Calibration/operation of Canberra Gamma Spectroscopy System, Rev. 8
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 Brunswick Steam Electric Plant Off-site Dose Calculation Manual (ODCM), Rev. 29
 Brunswick Steam Electric Plant Technical Specification 5.5.1, Offsite Dose Calculation Manual
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Brunswick Steam Electric Plant Technical Specification 5.6.3, Radioactive Effluent Release Reports

Brunswick Steam Electric Plant Updated FSAR, Chapter 9 Section 9.3.2.1

Brunswick Steam Electric Plant Updated FSAR, Chapter 11 Sections 11.2, 11.3 and 11.5

Brunswick Steam Electric Plant Unit Nos. 1 And 2 Radioactive Effluent Release Reports for 2003, 2004 and 2005

Results of Radiochemistry Cross Check Program 1st, 2nd, 3rd, and 4th quarter 2005

Quarterly Instrument QC Data Report, HPGe Detectors #1,2, 3 and 4, 1st quarter 2006

Quarterly Instrument QC Data Report Liquid Scintillation Counter, 1st quarter 2006

Response to Groundwater Protection- Data Collection Questionnaire

ORST-71.0, General Atomic Stack Radiation Monitor Channel Calibration (2-D12-RM-23S), 7/28/04

ORST-73.2, General Atomic Turbine Building Radiation Monitor (D12-RM-23) Channel Calibration, (U1) 12/8/05

ORST-73.2, General Atomic Turbine Building Radiation Monitor (D12-RM-23) Channel Calibration, (U2) 12/15/05

ORST-73.0, Reactor Building Roof Vent Radiation Monitor Channel Calibration CAC-AQH-1264, (U1), 5/29/06

ORST-73.0, Reactor Building Roof Vent Radiation Monitor Channel Calibration CAC-AQH-1264, (U2), 5/17/06

ACR Level II Evaluation for ACR 94-00626, Rad waste pipe leak

CR 97-00827, Groundwater Monitoring- Storm Drain Stabilization Pond

AR 179890, A review of the 2004 annual radiological effluent report indicates that Co-58 and the associated activity was omitted from the first and second quarter fission and activation products column. The activity was included in the total activity but was not listed as a line item.

AR-188107, On 3/16/06 samples of BSEP sewage sludge were analysed and found to contain low levels of activation products.

AR 185897, The main stack rad monitor unexpectedly rose from 1.52 to 2.26.

AR 204962, Tritium activity in manhole 6SW

BNAS 05-005, Radiation Protection Assessment, 2/23/2005

BNAS 05-026, Environmental & Chemistry Assessment, 7/19/2005

Section 2PS3: Radiological Environmental Monitoring Program (REMP) and Radioactive Material Control Program

Brunswick Steam Electric Plant Off-Site Dose Calculation Manual

DOS-NGGC-0011, Environmental Thermoluminescent Dosimeter (TDL) Monitoring, Rev.7

EVC-NGGC-0012, Preparation and Counting of Samples for Determination of Gamma Activity, Rev. 7

OE&RC-1271, Determination of the Lower Limit of Detection for Counting Systems, Rev. 8

OE&RC-3101, Radiological Environmental Monitoring Program, Rev. 6

OE&RC-3104, Land Use Census, Rev. 9

OE&RC-3107, Calibration and Use of Environmental Air Samplers, Rev. 8

BSEP 05-0023, Annual Radiological Environmental Operating Report for 2004

OE&RC-0115, Rev. 11, SAM Calibration Record, S/N 358, 03/20/06

OE&RC-3107, Environmental Air Sampler Dry Gas Calibration Form, Sampler Nos. BNP-1, BNP-5, BNP-7, BNP-10, BNP-11, and BNP-12, 01/31/06
Results of Radiochemistry Cross Check Program, Progress Energy, Brunswick Nuclear Plant, Calendar Year 2005
Work Order Package Nos. 00644627 and 00710638, Perform OPM-MET001 on the Met Tower Equipment/Calibration and Functional Testing, Six Month Testing/Replacing Parts, dated 08/08/05 and 01/17/06, respectively
AR No. 00151753, Air sampler was discovered off during daily operability check
AR No. 00204429, The Met Tower Upper Wind Speed and Direction Sensor was questions for valid indication
AR No. 157252, Missed air sample surveillance due to a blown fuse
AR No. 162768, TLD 31 was missing in the field and the cause could not be determined
AR No. 169546, Missed air sample surveillance due to a loss of power when tree limbs touched power lines during a storm and caused the fuse to blow on the power pole
Self-Assessment Report No. 113397, Radioactive Material Control
Self-Assessment Report No. 145004, 2005 BNP Environmental Risk Assessment

Section 40A1: Performance Indicator Verification

Liquid Release Permits, 062221,062259,062269
Monthly Gas Summary for July 2006
Weekly gas reports for 8/1/06-8/7/06 and 8/11/06
2004 Annual Radioactive Effluent Release Report
2005 Annual Radioactive Effluent Release Report
AR Searches for High Radiation, HRA, LHRA, and Postings.
Searches for ED alarms >100 mr above setpoint, dose rate alarms >1000mr/hr.
Brunswick Nuclear Power Plant, Off-Site Dose Calculation Manual (ODCM), Rev. 29
CAP-NGGC-0200, Corrective Action Program, Rev. 17
REG-NGGC-0009, NRC Performance Indicators And Monthly Operating Report Data, Rev. 5